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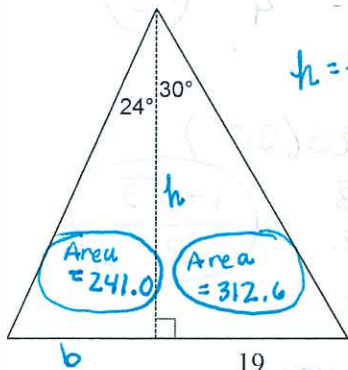
TP: 133

CW #58-61H: Review

Honors Geometry

Due: Thursday, Feb. 7<sup>th</sup>GOOD QUIZ PRACTICE #2, 6, 11, 12, 15, 16, 23, 24

- 1) Find the area of each triangle. Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth.



$$h = \tan(30) = 19/h$$

$$= 19/\tan(30)$$

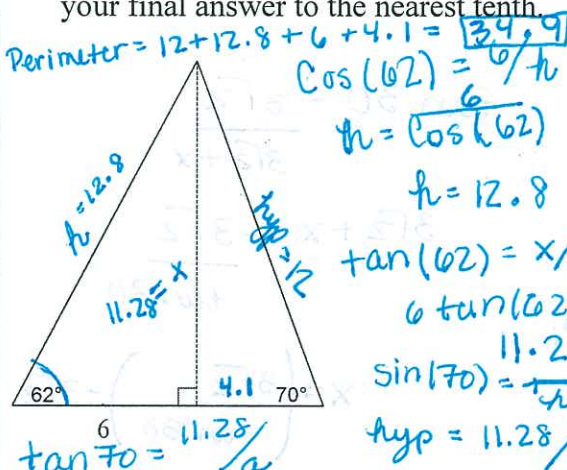
$$= 32.9$$

$$\frac{1}{2}(19)(32.9) = 312.6$$

$$b = \tan(24) = b/32.9$$

$$\frac{1}{2}(14.6)(32.9) = 241.0$$

- 2) Find the perimeter of the larger triangle. Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth.



$$\text{Perimeter} = 12 + 12.8 + 6 + 4.1 = 34.9$$

$$\cos(62) = 6/h$$

$$h = \frac{6}{\cos(62)}$$

$$h = 12.8$$

$$\tan(62) = x/6$$

$$6 \tan(62) = x$$

$$\sin(70) = \frac{11.28}{h}$$

$$h = \frac{11.28}{\sin(70)}$$

- 3) If in a right triangle  $\tan \theta = \frac{x}{5}$  and  $\sin \theta = \frac{x}{13}$ , then  $x = ?$



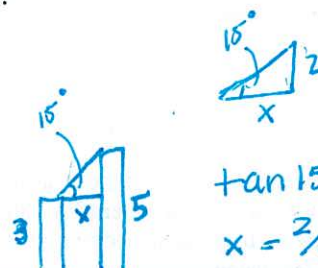
$$x^2 + 5^2 = 13^2$$

$$x^2 = 169 - 25$$

$$x = 12$$

- A. 1  
B. 7  
C. 12  
D. 144  
E. Cannot be determined from given information

- 4) Two vertical poles, one 3 meters tall and the other 5 meters tall, stand a certain distance apart. A line from the top of the shorter pole to the top of the taller pole makes a  $15^\circ$  angle with a horizontal line. Which of the following expresses the horizontal distance, in meters, between the bases of the two poles (rounded to the nearest hundredth)?

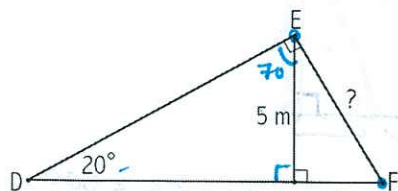


- A. 0.54  
B. -7.46  
C. 1.34  
D. 0.13  
E. 7.46

$$\tan 15 = \frac{2}{x}$$

$$x = \frac{2}{\tan 15}$$

- 5) Using the figure below, which of the following is the best approximation of EF?



$$180 - 20 - 90 = 70$$



$$90 - 70 = 20$$

- A. 0.6  
B. 5  
C. 5.3  
D. 5.8  
E. 7.5

$$\cos 20 = \frac{5}{EF}$$

$$5.32 = EF = 5/\cos 20$$

- 6) Find the **exact** value of  $\tan \frac{\pi}{4} + \sin 30^\circ$ . **Prove** your answer using special right triangles.

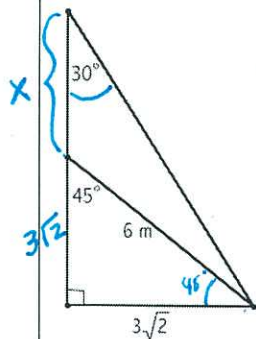
$$\tan \frac{\pi}{4} = 1$$

$$\sin 30^\circ = \frac{1}{2}$$

$$1 + \frac{1}{2} = \boxed{1.5}$$



7) After heavy winds damaged a farmhouse, workers placed a 6 meter brace against its side at  $45^\circ$  angle. Then, at the same spot on the ground, they place a second, longer brace to make a  $30^\circ$  angle with the side of the house. About how much higher on the house does the longer brace reach than the shorter brace?



$$\tan 30 = \frac{3\sqrt{2}}{3\sqrt{2} + x}$$

$$3\sqrt{2} + x = \frac{3\sqrt{2}}{\tan 30}$$

$$x = \left( \frac{3\sqrt{2}}{\tan 30} \right) - 3\sqrt{2}$$

$$x = 3.1$$

- A. 2.5 m
- B. 3.1 m**
- C. 5 m
- D. 8.5 m
- E. 12.6 m

8) If  $f(x) = \sin x$ ,  $g(x) = \cos x$ . Find the exact value of the following:

a)  $(f \times g)\left(\frac{\pi}{4}\right)$

$$\sin\left(\frac{\pi}{4}\right) \times \cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \frac{2}{4} = \frac{1}{2}$$



b)  $(f + g)(30^\circ)$

$$\sin(30^\circ) + \cos(30^\circ)$$

$$\frac{1}{2} + \frac{\sqrt{3}}{2} = \frac{1 + \sqrt{3}}{2}$$

c)  $(f - g)\left(\frac{\pi}{3}\right)$

$$\sin\left(\frac{\pi}{3}\right) - \cos\left(\frac{\pi}{3}\right)$$

$$\frac{\sqrt{3}}{2} - \frac{1}{2} = \frac{\sqrt{3} - 1}{2}$$

9)

**Inclined Plane** See the illustration. If friction is ignored, the time  $t$  (in seconds) required for a block to slide down an inclined plane is modeled by the function

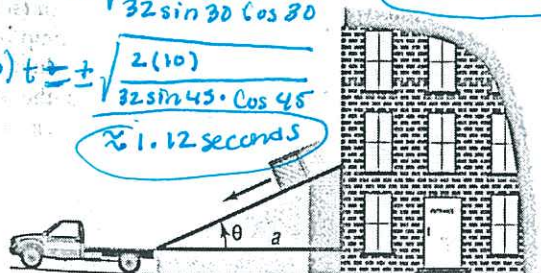
$$t(\theta) = \sqrt{\frac{2a}{g \sin \theta \cos \theta}}$$

where  $a$  is the length (in feet) of the base and  $g \approx 32$  feet per second per second is the acceleration due to gravity. How long does it take a block to slide down an inclined plane with base  $a = 10$  feet when

- (a)  $\theta = 30^\circ$ ? (b)  $\theta = 45^\circ$ ? (c)  $\theta = 60^\circ$ ?

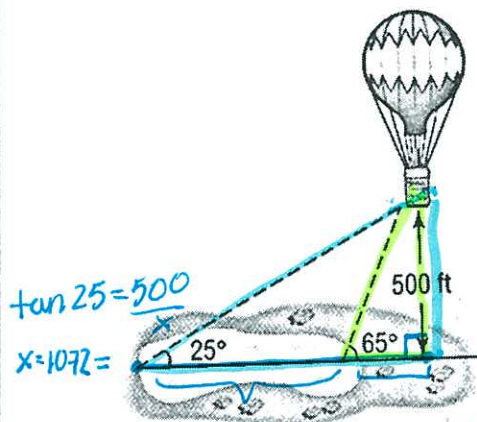
a)  $t = \sqrt{\frac{2(10)}{32 \sin 30 \cos 30}} \approx 1.20 \text{ seconds}$

b)  $t = \sqrt{\frac{2(10)}{32 \sin 45 \cos 45}} \approx 1.12 \text{ seconds}$



c)  $t = \sqrt{\frac{2(10)}{32 \sin 60 \cos 60}} \approx 1.20 \text{ seconds}$

10) **Measuring the Length of a Lake** From a stationary hot-air balloon 500 ft above the ground, two sightings of a lake are made (see figure). How long is the lake?



$$\tan 25 = \frac{500}{x}$$

$$x = 1072$$

$$= 1072 - 233.15$$

$$= 839.10 \text{ ft}$$

$$\tan 65 = \frac{500}{x}$$

$$x = 233.15$$

11) Convert each angle in degrees to radians. Express your answer in simplest form and in terms of  $\pi$ .

a)  $17^\circ$

$$\frac{17\pi}{180}$$

b)  $-40^\circ$

$$-2\pi/9$$

c)  $125^\circ$

$$25\pi/36$$

d)  $270^\circ$

$$3\pi/2$$

12) Convert each radian to degrees. Round your answer to the nearest degree.

a) 3.14

$$180^\circ$$

b) 0.75

$$43^\circ$$

c) 6.32

$$362^\circ$$

d)  $\sqrt{2}$

$$81^\circ$$

13) **Finding the Distance of a Ship from Shore** A person in a small boat approximately 173 ft. offshore from a vertical cliff known to be 100 ft. is looking up. If his line of sight is directed at the top of the cliff, at what angle is his head tilted?

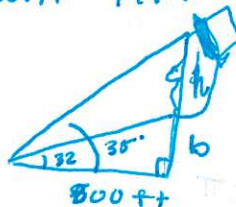


$$\tan^{-1}(100/173) = 30^\circ$$

14) **CHALLENGE**

**Mt. Rushmore** To measure the height of Lincoln's caricature on Mt. Rushmore, two sightings 800 feet from the base of the mountain are taken. If the angle of elevation to the bottom of Lincoln's face is  $32^\circ$  and the angle of elevation to the top is  $35^\circ$ , what is the height of Lincoln's face?

$$560.17 - 499.90 = 60.27 = \text{height of face}$$



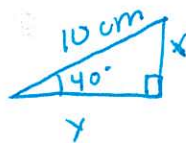
$$\tan(32^\circ) = \frac{b}{800}$$

$$b = 499.90$$

$$\tan(35^\circ) = \frac{b+h}{800}$$

$$b+h = 800 \tan(35^\circ) \approx 560.1$$

15) A right triangle has a hypotenuse of length 10 centimeters. If one angle is  $40^\circ$ , find the length of each leg.



two answers

$$\sin 40^\circ = \frac{x}{10}$$

$$\tan 40^\circ = \frac{6.43}{y} \quad x = 6.43$$

$$y = 7.66$$

can be switched depending on

16) A right triangle contains a  $25^\circ$  angle. If one leg is of length 5 inches, what is the length of the hypotenuse? There are two answers. How is this possible?

Case 1. opp leg = 5

$$\sin(25^\circ) = 5/\text{hyp}$$

$$\text{hyp} = 11.83$$

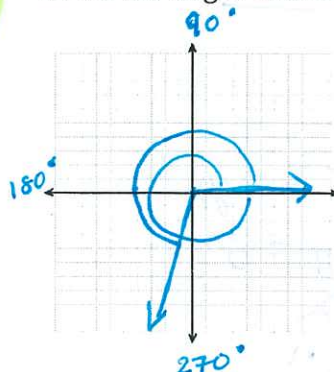


Case 2: adj. = 5

$$\cos(25^\circ) = \frac{5}{x} \quad x = 4.53$$



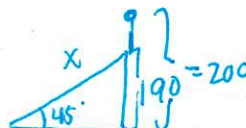
17) Draw an angle that measures  $625^\circ$



$$\begin{array}{r} 625 \\ - 360 \Rightarrow 1 \text{ time around} \\ \hline 265 \\ - 180 \leftarrow \text{half way} \\ \hline 85 \leftarrow \text{almost } 90 \end{array}$$

18)

**Finding the Length of a Guy Wire** A radio transmission tower is 200 feet high. How long should a guy wire be if it is to be attached to the tower 10 feet from the top and is to make an angle of  $45^\circ$  with the ground?



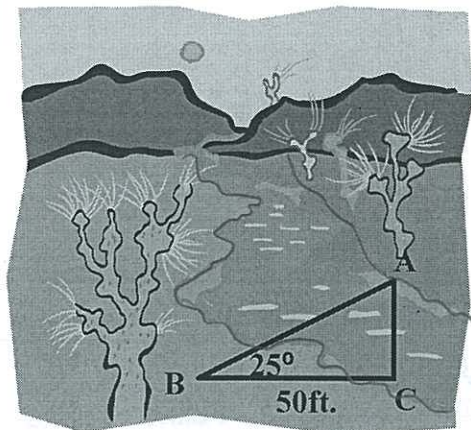
$$45, 45, 90^\circ$$

$$x = 190\sqrt{2}$$

$$\approx 268.7 \text{ ft}$$



19) **Finding the Width of a River** Find the distance from A to C across the river illustrated in the figure.



$$\tan(25^\circ) = \frac{AC}{50}$$

$$AC = 23.3 \text{ ft}$$

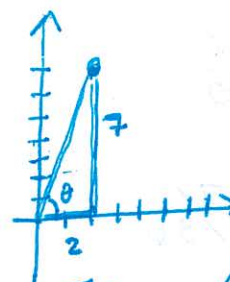
$$50 \tan(25^\circ) = AC$$

20) The point (x,y) is on the terminal side of an angle  $\theta$  in standard position. Find the exact value of the given trigonometric function and  $\theta$ .

(2,7),  $\sin \theta$

$$\text{hyp} = \sqrt{2^2 + 7^2}$$

$$\text{hyp} = \sqrt{53}$$

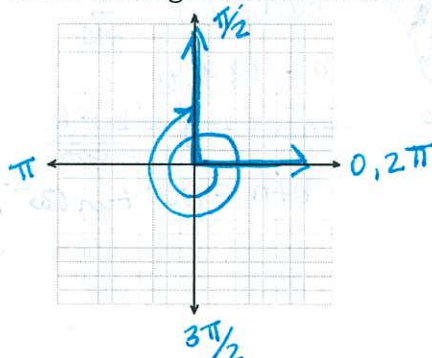


$$\sin \theta = \frac{7}{\sqrt{53}} = \frac{7\sqrt{53}}{53}$$

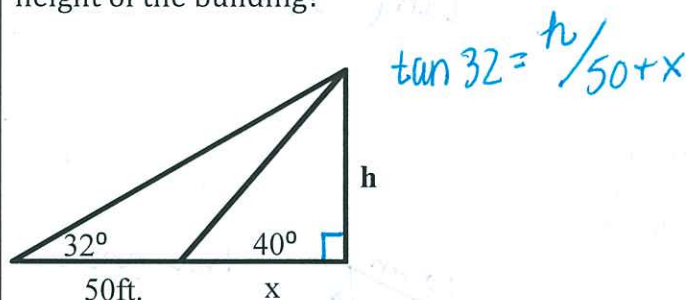
$$\theta = \tan^{-1}(7/2)$$

$$\theta = 74.1^\circ$$

21) Draw an angle that measures  $\frac{-7\pi}{2}$  radians.



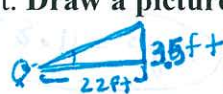
22) To measure the height of a building, two sightings are taken a distance of 50 ft apart. If the first angle of elevation is  $40^\circ$  and the second is  $32^\circ$ , what is the height of the building?



$$\tan 32^\circ = \frac{h}{50+x}$$

23) 6'6" Kobe Bryant stands at the three point line during practice. The distance from the three point line to the point on the floor below the basket is 22 ft. If the height of the basket is 10 ft, find the angle of elevation from the player's line of sight to the basket. **Draw a picture to help you.**

$$10 \text{ ft} - 6' = 4 \text{ ft} - 6 \text{ in}$$



$$\tan^{-1}\left(\frac{3.5}{22}\right) = 9.0^\circ$$

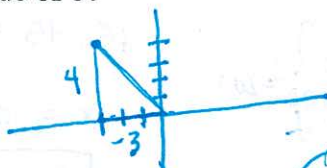
$$12 \text{ in} = 1 \text{ ft}$$

a) What if he tries his luck at a half court basket, where the distance is 47 ft to the basket?



$$\tan^{-1}\left(\frac{3.5}{47}\right) = 21.3^\circ$$

24) Find the exact value of each of the three remaining trigonometric functions of an angle  $\theta$  if (-3,4), is a point on the terminal side of  $\theta$ .



$$3^2 + 4^2 = \text{hyp}^2$$

$$\text{hyp} = 5$$

$$\sin \theta = \frac{4}{5}$$

$$\cos \theta = \frac{-3}{5}$$

$$\tan \theta = \frac{4}{-3}$$

$$\theta = 126.9^\circ$$